APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,419	02/10/2004	Ashish Tiwari	SRI 4840-2	9732

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EXAMINER
PIERRE LOUIS, ANDRE

ART UNIT	PAPER NUMBER
2123	

MAIL DATE	DELIVERY MODE
07/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/775,419	TIWARI ET AL.
	Examiner	Art Unit	
	Andre Pierre-Louis	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>30 April 2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-9</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-9</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   The amendment filed on 4/30/2007 has been received and fully considered; claims 1-9

are presented for examination.

2.   Regarding the rejection under 35 USC 101, the Examiner withdraws the rejection in view

of the amendment.

Response to Arguments

3.   Applicant's arguments filed 4/30/2007 have been fully considered but they are moot in

view of the new ground of rejections. However, Applicant argues that the combined reference

cited do not teach the construction step of the claims, the Examiner respectfully notes that

although a secondary reference is brought to cover some of the limitation argued by the

applicant, including this limitation, Hsieh et al. substantially teaches the construction of a model

based on key values *(pg.142-143)* and Bultan et al. substantially teaches constructing a model

over set of variables *(pg.752-754)*. Nevertheless, Vangheluwe, which is now relied upon for

further support, in combination the already cited reference, fully supports the Examiner's

position in the rejection.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the

claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c)

and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4.0   Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bultan et al.

(ACM Transaction 1999, Model-checking of Concurrent Systems with Unbounded Integer

Variable: Symbolic Representations, Approximation, and Experimental Results), in view Multi-

Formalism Modelling and Simulation, by Hans Vangheluwe (2000-2001).

        4.1   In considering claim 1, Bultan et al. substantially teaches a method of

constructing an abstract discrete system suitable for formal analysis from a hybrid system, with

respect to a property of interest, said method comprising the steps of: a) selecting a set of

polynomials from the polynomials contained in the property of interest and the hybrid system

(pg.751-753); c) constructing the abstract discrete system over a set of abstract states defined by

the positive, negative and zero valuation of the saturated set of polynomials *(pg.751-753, 768-*

772); d) storing the abstract discrete system *(pg.759-761,766)*. However, Bultan et al. does not

expressly teaches the step of b) saturating the selected set of polynomials; but Vangheluwe

substantially teaches a step of saturating the set of polynomials *(pg.101-105)*. Vangheluwe

further teaches constructing an abstract discrete model *(see pg.139-140, 146-147)*. Bultan et al.

and Vangheluwe are analogous art because they from the same field of endeavor and that the

modelling and simulation teaches by Vangheluwe is similar to that of Bultan et al. Therefore, it

would been obvious to one ordinary skilled in the art to combine the modelling and simulation

system teaches by Vangheluwe with the model checking system of Bultan et al. because

Vangheluwe teaches advantage of achieving tremendous flexibilities *(pg. 170)*, and many other

advantages can be found on page 93-94.

4.2   As per claim 2, the combined teachings of Bultan et al. and Vangheluwe

substantially teach that the step of saturating the selected set of polynomials is stopped before

normal termination *(see Vangheluwe pg.175-177, also see Bultan et al. 775)*.

4.3   As per claim 3, the combined teachings of Bultan et al. and Vangheluwe

substantially teach that the hybrid system has no discrete components *(see Bultan et al. pg. 752-*

754, 764-768; also see Vangheluwe pg.22, 59).

4.4   As per claims 4, the combined teachings of Bultan et al. and Vangheluwe

substantially teach that eigenvectors are used to generate polynomials *(see Vangheluwe pg.118,*

also see Bultan et al. pg. 762-768).

4.5   With regards to claim 5, the combined teachings of Bultan et al. and Vangheluwe

substantially teach a method for determining the validity of a property of interest with respect to

a hybrid system, said method comprising the steps of: a) abstracting the hybrid system to create

an abstract discrete system *(see Vangheluwe pg.139-140, 146-147)*, wherein abstracting

comprises constructing an abstract system over a set of abstract states defined by positive,

negative, and zero valuation of a saturated set of polynomials constructed by saturating an initial

set of polynomials selected from the polynomials contained in the property of interest and the

hybrid system *(see Vangheluwe pg.7; also see Bultan et al. pg.751-753);* b) analyzing the

validity of the property of interest with respect to the abstract discrete system *(see Bultan et al.*

751-753 and 764-768; also see Vangheluwe pg.145-150); outputting the validity of the property

of interest *(see Vangheluwe pg.6-12,19,25; also see Bultan et al. pg.764,773).*

4.6   Regarding claim 6, the combined teachings of Bultan et al. and Vangheluwe

substantially teach that the property of interest is invalid with respect to the abstract discrete

system, creating a finer abstraction of the hybrid system and analyzing the property of interest

with respect to the finer abstraction *(see Bultan pg.751, 760-773; also see Vangheluwe pg.11,*

12,29,52-56).

4.7   As per claim 7, the combined teachings of Bultan et al. and Vangheluwe

substantially teach that analyzing the validity of the property of interest is performed by model

checking *(see Bultan et al. title, pg.752, 764; also see Vangheluwe pg.7, 145-50).*

5.   Claim 1-7 is further rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh et

al. (IEEE 1998, Model abstraction for formal verification), in view Multi-Formalism Modelling

and Simulation, by Hans Vangheluwe (2000-2001).

5.1   In considering claim 1, Hsieh et al. substantially teaches a method of constructing

an abstract discrete system suitable for formal analysis from a hybrid system, with respect to a

property of interest, said method comprising the steps of: a) selecting a set of polynomials from

the polynomials contained in the property of interest and the hybrid system *(pg.140-143);* c)

constructing the abstract discrete system over a set of abstract states defined by the positive,

negative and zero valuation of the saturated set of polynomials *(pg.140-143);* d) storing the

abstract discrete system *(pg.145).* However, Hsieh et al. does not expressly teaches the step of b)

saturating the selected set of polynomials; but Vangheluwe substantially teaches a step of

saturating the set of polynomials *(pg.101-105).* Vangheluwe further teaches constructing an

abstract discrete model *(see pg.139-140, 146-147)*. Hsieh et al. and Vangheluwe are analogous

art because they from the same field of endeavor and that the modelling and simulation teaches

by Vangheluwe is similar to that of Hsieh et al. Therefore, it would been obvious to one ordinary

skilled in the art to combine the modelling and simulation system teaches by Vangheluwe with

the model checking system of Hsieh et al. because Vangheluwe teaches advantage of achieving

tremendous flexibilities *(pg.170)*, and many other advantages can be found on page 93-94.

      5.2   With regards to independent claim 5, the combined teachings of Hsieh et al. and

Vangheluwe substantially teach a method for determining the validity of a property of interest

with respect to a hybrid system, said method comprising the steps of: a) abstracting the hybrid

system to create an abstract discrete system *(see Vangheluwe pg.139-140, 146-147)*, wherein

abstracting comprises constructing an abstract system over a set of abstract states defined by

positive, negative, and zero valuation of a saturated set of polynomials constructed by saturating

an initial set of polynomials selected from the polynomials contained in the property of interest

and the hybrid system *(see Vangheluwe pg.7, 139-140, 146-147; also see Hsieh et al. pg.140-*

147); b) analyzing the validity of the property of interest with respect to the abstract discrete

system *(see Hsieh et al. pg.140-141; also see Vangheluwe pg.145-150);* outputting the validity of

the property of interest *(see Vangheluwe pg.6-12,19,25; also see Hsieh et al. pg.144)*.

6.   Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bultan et al.,

in view of Multi-Formalism Modelling and Simulation, by Hans Vangheluwe (2000-2001), as

applied to claims 1-7 above, and further in view of Lincoln et al. (USPG_PUB No.

2003/0033126).

6.1   Regarding claims 8-9, Bultan et al., as modified by Vangheluwe, teaches most of

the instant invention; however, he does not expressly teach that the hybrid system is a model of a

biological system. Lincoln et al. substantially teaches that the hybrid system is a model of a

biological system (see Title). Lincoln et al., Bultan et al., and Vangheluwe are analogous art

because they are from the same field of endeavor and that the model analyses by Lincoln et al. is

similar to that of Bultan et al. and Vangheluwe. Therefore, it would have been obvious to one

ordinary skilled in the art at the time of the applicant's invention to combine the biological

system modeling of Lincoln et al. with the Model checking system of Bultan et al., and the

modelling and simulation system of Vangheluwe because Lincoln teaches the advantage of

decision diagram for efficiency manipulation and representation and the improvement of

efficiency (para 0090), and Vangheluwe teaches advantage of achieving tremendous flexibilities

(pg. 170), and many other advantages can be found on page 93-94.
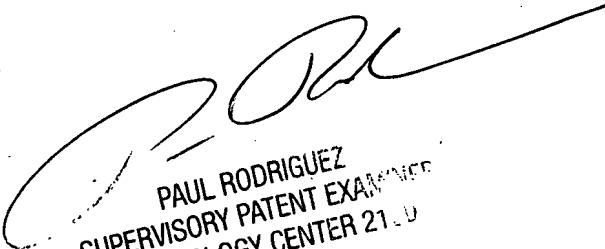
Conclusion

7.   Claims 1-9 are rejected and **this is Non-Final**. Any inquiry concerning this

communication or earlier communications from the examiner should be directed to Andre Pierre-

Louis whose telephone number is 571-272-8636. The examiner can normally be reached on

Mon-Fri, 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Paul L. Rodriguez can be reached on 571-272-3753. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

July 15, 2007

APL

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